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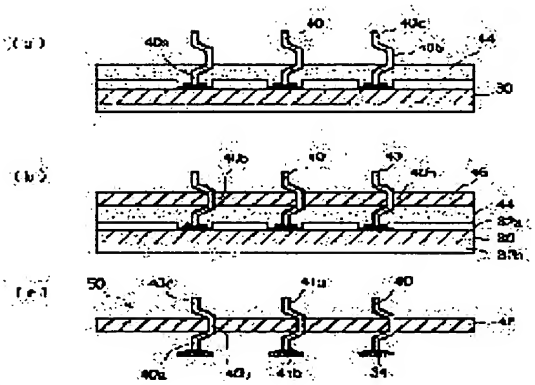
(54) MANUFACTURING METHOD OF INTERPOSER

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce the manufacturing costs by improving the manufacturing yields of an interpose having a contact terminal formed in a flex shape on both surfaces of a support substrate.
SOLUTION: The manufacturing method of the interpose comprises a process for coating both surfaces of the substrate 30 with an insulating film, and for forming the insulating film on one surface of the substrate on a resist pattern 32a where a site for forming the contact terminal is exposed; a process for performing wire bonding for bonding the base edge of the wire to the exposed section of the resist pattern, and for forming a contact terminal 40 having a flexed section where the base edge side and the tip side are formed in a flex shape and a middle section for connecting the base edge side and the flex section of the tip side; a process for coating a surface where the contact terminal of the substrate is formed to a depth where a flex section 40a at the base edge side of the contact terminal is buried by the insulating film 44; a process for laminating a resin material that becomes a support substrate 46 to a depth for burying the middle section 40b of the contact terminal on the surface of the insulating film; and a process for removing the insulating film 44 and the substrate 30.



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CLAIMS

[Claim(s)]
[Claim 1]
In the manufacture approach of INTAPOZA that the contact terminal which was formed in the crookedness configuration and connected mutually electrically was prepared in one field of a support substrate, and the field of another side,
The process formed in the resist pattern with which covers both sides of a substrate by the insulating coat, and the part which forms said contact terminal exposes the insulating coat of one field of this substrate,
the outcrop of the substrate covered with said resist pattern -- a conductor -- the process which forms the film,
The process which forms the contact terminal equipped with the pars intermedia which connects the flection the flection which gives wirebonding which carries out bonding of the end face of a wire to the outcrop of said resist pattern, and by which a end face and tip side is respectively formed in a crookedness configuration, and by the side of a end face and a tip,
The process which covers with an insulating coat the field in which the contact terminal of said substrate was formed, in the depth in which the flection by the side of the end face of a contact terminal is buried,
The process which carries out the laminating of the resin material used as said support substrate to the depth which makes said pars intermedia of said contact terminal buried in the front face of said insulating coat,
The manufacture approach of INTAPOZA characterized by having the process which removes said insulating coat and said substrate.
[Claim 2]
The manufacture approach of INTAPOZA according to claim 1 characterized by having the process which galvanizes on the surface of a contact terminal by using said substrate as a plating electric supply layer after the process which forms said contact terminal.
[Claim 3]
the process which forms said contact terminal -- setting -- the end face of a wire -- a conductor -- the manufacture approach of INTAPOZA according to claim 1 or 2 characterized by joining to the film, pulling up, making a wire crooked, melting the raising edge of a wire, and forming a contact terminal.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]
This invention relates to the manufacture approach of INTAPOZA used for the electrical installation between electronic parts etc.
[0002]
[Description of the Prior Art]
Drawing 5 shows the example which constituted the fixture used for the trial of a semi-conductor wafer using INTAPOZA. In this drawing, 10 is a probe card, 12 is an interface board, and it is INTAPOZA 14 which is arranged in these middle. INTAPOZA 14 currently used with the fixture for this trial is characterized by forming the contact terminal 20 which the thin wire was made crooked to both sides of the support substrate 16, and was formed in them. By contacting elastically by pressing electrode terminal 10a prepared in the probe card 10, and electrode terminal 12a prepared in the interface board 12, the contact terminal 20 has connected the probe card 10 and the interface board 12 electrically.
[0003]
Drawing 6 is the sectional view having expanded and shown INTAPOZA 14. Two or more through holes through which it flowed electrically are established in an insulating substrate as INTAPOZA shown in drawing 6 , and INTAPOZA of isomorphism voice, the connection which is made to expose to both sides of an insulating substrate, and is electrically connected to each through hole is prepared in U.S. Pat. No. 6029344, and the configuration which connected the contact terminal of a crookedness configuration so that it might become symmetry arrangement up and down at the connection of both sides of an insulating substrate is indicated. The contact terminal of each other which set up in the crookedness configuration and was prepared in both sides of an insulating substrate is electrically connected through a through hole. All the contact terminals prepared in the top face of an insulating substrate are formed in the same configuration, and the contact terminal prepared in the inferior surface of tongue of an insulating substrate is also formed in the same configuration. In drawing 6 , the connection 19 electrically connected with the conductor layer 18 formed in the internal surface of a through tube 17 was exposed and formed in both sides of the support substrate 16, the contact terminal 20 joined to the connection 19, and the contact terminal 20 of both sides of the support substrate 16 has connected electrically in each through hole.
[0004]
[Problem(s) to be Solved by the Invention]
Since INTAPOZA 14 shown in drawing 6 has elasticity when the contact terminal 20 formed in both sides of the support substrate 16 is crooked, when it is used as INTAPOZA, connections, such as an electrode terminal, are elastically contacted by pressing by the contact terminal 20, it can connect electrically, and it has the advantage that the electrical installation between electronic parts is made certainly.
However, when a contact terminal 20 was formed in both sides of the support substrate 16, since the yield in one field of the support substrate 16 and the yield in the field of another side

would be multiplied, the yield as the whole product fell and the approach of giving each of one field of the support substrate 16 and the field of another side wirebonding, and forming a contact terminal 20 had the problem that a manufacturing cost became high by this. Moreover, since wirebonding was given to one field of the support substrate 16, and the field of another side, respectively, the manufacture man day started and there was a problem that a manufacturing cost became high also by this.

[0005]

In addition, as it said that INTAPOZA in which the contact terminal was formed to both sides of a support substrate was used as the approach of using it, using it for the fixture for a trial shown in drawing 5 , and also making intervene between the circuit boards, and a socket in which a semiconductor device is carried, it can use for various applications.

This invention makes it possible to manufacture more efficiently INTAPOZA in which the contact terminal was formed to both sides of the support substrate mentioned above, raises the manufacture yield and aims at offering the manufacture approach of INTAPOZA which can reduce a manufacturing cost.

[0006]

[Means for Solving the Problem]

This invention is equipped with the next configuration in order to attain the above-mentioned purpose.

Namely, it is formed in a crookedness configuration in one field of a support substrate, and the field of another side, and sets to the manufacture approach of INTAPOZA that the contact terminal connected mutually electrically was prepared. The process formed in the resist pattern with which covers both sides of a substrate by the insulating coat, and the part which forms said contact terminal exposes the insulating coat of one field of this substrate, the outcrop of the substrate covered with said resist pattern -- a conductor -- with the process which forms the film Wirebonding which carries out bonding of the end face of a wire to the outcrop of said resist pattern is given. The process which forms the contact terminal equipped with the pars intermedia where a end face and tip side connects the flection the flection respectively formed in a crookedness configuration, and by the side of a end face and a tip, The process which covers with an insulating coat the field in which the contact terminal of said substrate was formed, in the depth in which the flection by the side of the end face of a contact terminal is buried, It is characterized by having the process which removes the process which carries out the laminating of the resin material used as said support substrate to the depth which makes said pars intermedia of said contact terminal buried in the front face of said insulating coat, and said insulating coat and said substrate.

[0007]

Moreover, it is characterized by having the process which galvanizes on the surface of a contact terminal by using said substrate as a plating electric supply layer after the process which forms said contact terminal.

moreover, the process which forms said contact terminal -- setting -- the end face of a wire -- a conductor -- it is characterized by joining to the film, pulling up, making a wire crooked, melting the raising edge of a wire, and forming a contact terminal.

[0008]

[Embodiment of the Invention]

Hereafter, the gestalt of suitable operation of this invention is explained to a detail according to an accompanying drawing.

Drawing 1 and 2 are the explanatory views showing the manufacture approach of INTAPOZA concerning this invention. Hereafter, it explains according to a production process.

Drawing 1 shows a production process until it forms a contact terminal. Drawing 1 (a) shows the substrate 30 which supports the contact terminal formed by wirebonding. Although a large-sized substrate is used as a work piece in an actual production process in order to take and carry out much INTAPOZA, the part which serves as INTAPOZA per product is expanded and shown on explanation by a diagram.

With this operation gestalt, the copper plate was used as a substrate 30. A substrate 30 uses

the ingredient of thickness suitably in consideration of workability. In the case of a copper plate, a thing with a thickness of about 0.1-0.5mm should just be used. Since a substrate 30 is etched chemically and removed at a back process, not only a copper plate but the proper ingredient which etches simply and can be removed can be used for it.

[0009]

Drawing 1 (b) applies a photosensitive resist to both sides of a substrate 30 as an insulating coat, and shows the condition of having performed exposure and development and having formed resist pattern 32a in one field (top face) of a substrate 30. Resist pattern 32a is formed in the pattern to which the part which forms a contact terminal 20 on a substrate 30 is exposed. The whole surface of a substrate 30 is covered with resist 32b about the field of another side of a substrate 30.

[0010]

the conductor which drawing 1 (c) gives electrolysis gilding to a substrate 30, and consists outcrop 30a of one field of a substrate 30 of gilding -- the condition of having covered with the film 34 is shown. a conductor -- the film 34 is formed in order to make good bonding nature at the time of forming a contact terminal by wirebonding. Therefore, it can also form with the plating by the metal which makes good bonding nature other than electrolysis gilding, such as palladium. since etching removes a substrate 30 at a back process as mentioned above -- a conductor -- the film 34 is good to use the metal which is not removed depending on the etching reagent which etches this substrate 30. moreover, a conductor -- since it finally exposes outside as a connection of a contact terminal, the film 34 can also be considered as two or more metal lamination, as it said that gilding and palladium plating were performed to this order in consideration of weatherability

[0011]

Drawing 1 (d) shows the condition of having formed the contact terminal 40 by wirebonding which used the golden wire.

Although a contact terminal 40 is formed in the crookedness configuration where the side-face configuration formed the flection of L typeface in the both sides by the side of a end face as shown in drawing, and a tip, such a crookedness configuration can be acquired by controlling a motion of the capillary which operates a golden wire. namely, the end face of a golden wire -- a conductor -- after joining to the film 34, a capillary is pulled up upward, and subsequently to the order of sideways-facing-up-sideways-facing up, it can be made to be able to move and can form by melting the raising edge of the golden wire pulled up.

[0012]

by performing the above crookedness actuation shows to drawing 1 (d) -- as -- a contact terminal 40 -- a conductor -- it will have standing-up section 40a by the side of the end face linked to the film 34, standing-up section 40b of pars intermedia, and standing-up section 40c by the side of a tip. By this, the amount of [of a contact terminal 40] end face flank becomes the flection crooked to L typeface between standing-up section 40b of pars intermedia, and it becomes the flection to which the tip side of a contact terminal 40 is crooked to L typeface between standing-up section 40b of pars intermedia.

For whole quantity, the die length of standing-up section 40a by the side of about 2.5mm and a end face is [the die length of standing-up section 40c by the side of about 1mm and a tip of the contact terminal 40 of an operation gestalt] about 1mm.

Although the golden wire of diameter extent of 30 micrometer is used with this operation gestalt, in order to acquire a fixed width method and fixed elasticity, wirebonding of the wire rod of a ribbon form (thin plate-like) may be carried out, and a contact terminal 40 may be formed.

[0013]

Drawing 1 (e) shows the condition of having performed rigid plating 42 to the front face of a contact terminal 40, with the electrolysis plating which uses a substrate 30 as a plating electric supply layer in order to give fixed elasticity to a contact terminal 40. In itself, even if a golden wire is supple, it does not have sufficient elasticity. For this reason, rigid plating is performed and necessary rigidity and elasticity are acquired as a contact terminal 40. Nickel-cobalt alloy plating etc. can be used as rigid plating. With this operation gestalt, after performing these rigid plating

42, it plated with gold on the front face of the rigid plating 42 as protection plating which gives weatherability.
In addition, after performing rigid plating, the elasticity of a contact terminal 40 can be further raised by heat-treating at necessary temperature.
[0014]
Drawing 2 shows a production process until it forms INTAPOZA, after forming a contact terminal 40.
Drawing 2 (a) shows the condition of having covered the field in which the contact terminal 40 of a substrate 30 was formed with the resist 44 which is an insulating coat. As a resist 44 crosses the field in which the contact terminal 40 of a substrate 30 was formed to the whole surface and becomes the thickness which a tip side exposes, i.e., the thickness in which the flection by the side of the end face of a contact terminal 40 (part of standing-up section 40a and standing-up section 40b to connect) is buried, from standing-up section 40b of the pars intermedia of a contact terminal 40, it is mostly covered to homogeneity. By applying liquid-like resist material to the front face of a substrate 30, a resist 44 can cover the whole surface of a substrate 30 by the thickness of homogeneity mostly.
[0015]
Drawing 2 (b) is the process which forms the support substrate 46 of INTAPOZA, and shows the condition of having applied the resin material used as the support substrate 46 to the front face of a resist 44. Here, resin material is applied so that it may become the thickness of homogeneity covering the thickness in which standing-up section 40b of the pars intermedia of a contact terminal 40 is buried all over a substrate 30. The coating thickness of resin material is about 500 micrometers. The proper resin which has electric insulation, for example, the heat-curing mold resin of an epoxy system etc., can be used for resin material. When using heat-curing mold resin, it heats and resin material is stiffened, after applying resin material. By stiffening resin material in the condition that the contact terminal 40 is supported by the substrate 30, deformation of the support substrate 46 can be suppressed and resin material can be stiffened. Thus, in case a substrate 30 stiffens the resin material of a hardening mold and forms the support substrate 46, it also has the shape-retaining operation which suppresses deformation.
[0016]
Drawing 2 (c) shows the condition of having etched the resist 44 and the substrate 30 chemically and having removed them in order to leave only the support substrate 46.
Since etching of the substrates 30, such as a resist 44 and a copper plate, cannot be performed depending on the same etching reagent, the actuation which etches a resist 44 and a substrate 30 A resist 44 is etched previously (Resists 32a and 32b are removed in that case). Then, the approach of etching and removing a substrate 30 may be used, and after etching and removing a substrate 30 (resist 32b is removed in that case), the approach of etching and removing a resist 44 may be used.
In this way, as shown in drawing 2 (c), INTAPOZA 50 equipped with the contact terminal formed in both sides of the support substrate 46 which consists of resin at the crookedness configuration which has elasticity is obtained.
[0017]
Drawing 3 shows the condition of having seen INTAPOZA 50 formed in the piece of an individual from the top face. Predetermined spacing is opened in the direction in every direction at the support substrate 46 formed in the rectangle, and it is arranged in line by the contact terminal 40.
As INTAPOZA 50 of this operation gestalt was shown in drawing 2 (c), 1st contact terminal 41a and 2nd contact terminal 41b were formed in the fields of one side of the support substrate 46, and another side. That is, the part by the side of the tip of the contact terminal 40 formed previously in one acts as the 1st contact terminal 41a crooked to L typeface by the top-face side of the support substrate 46, and the part by the side of the end face of a contact terminal 40 acts as the 2nd contact terminal 41b crooked to L typeface by the inferior-surface-of-tongue side of the support substrate 46. the edge of 2nd contact terminal 41b — a conductor —

the film 34 has covered.
[0018]
Drawing 4 shows the example in which the fixture used for the trial of a semi-conductor wafer using INTAPOZA of the operation gestalt mentioned above was formed. INTAPOZA 50 intervened between the probe card 10 and the interface board 12, and has connected the probe card 10 and the interface board 12 electrically. 1st contact terminal 41a formed in one field of the support substrate 46 of INTAPOZA 50 contacts by pressing elastically in electrode terminal 12a of an interface board 12, and 2nd contact terminal 41b formed in the field of another side of the support substrate 46 contacts by pressing elastically in electrode terminal 10a of a probe card 10, and flows electrically in it.
[0019]
As mentioned above, by the manufacture approach of this operation gestalt By a series of production processes of forming a contact terminal 40 in a predetermined crookedness configuration to one field of a substrate 30, and forming the support substrate 46 of a gestalt with which resin material was applied to the substrate 30, and the laminating of the insulating material was carried out to the substrate 30 Since INTAPOZA can be formed, it becomes a production process suitable for mass production, and there is an advantage that INTAPOZA can be manufactured efficiently. Moreover, since wirebonding is given and formed only about one field of a substrate 30 in case a contact terminal 40 is formed, compared with the approach of carrying out wirebonding to both sides of a substrate, respectively, and forming a contact terminal in them, the fall of the manufacture yield by bonding mistake can be suppressed effectively, and there is an advantage that a manufacturing cost can be lowered by this. Moreover, it is also possible to suppress the fall of the yield further by advancing to the process in which the configuration of a contact terminal 40 etc. is examined where a contact terminal 40 is formed, and only an excellent article forms the support substrate 46 by wirebonding.
[0020]
[Effect of the Invention]
The manufacture yield can be raised, while according to the manufacture approach of INTAPOZA concerning this invention being able to manufacture INTAPOZA equipped with the contact terminal formed in both sides of a support substrate at the crookedness configuration and being able to reduce a manufacture man day by actuation which carries out wirebonding only to one field of a substrate, as mentioned above. Moreover, according to the manufacture approach of INTAPOZA concerning this invention, INTAPOZA can be manufactured by a series of production processes, manufacture effectiveness can be raised, and the higher efficacy of being able to reduce a manufacturing cost is done so.
[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the manufacture approach of INTAPOZA concerning this invention.
[Drawing 2] It is the explanatory view showing the manufacture approach of INTAPOZA concerning this invention.
[Drawing 3] It is the top view of INTAPOZA formed in the piece of an individual.
[Drawing 4] It is the explanatory view showing the example which constituted the fixture for a trial using INTAPOZA.
[Drawing 5] It is the explanatory view showing the conventional configuration of INTAPOZA used for the fixture for a trial.
[Drawing 6] It is the sectional view showing the configuration of conventional INTAPOZA.
[Description of Notations]
10 Probe Card
12 Interface Board
14 INTAPOZA
20 Contact Terminal
30 Substrate
30a Outcrop
32a Resist pattern

32b Resist
34 Conductor — Film
40 Contact Terminal
40a, 40b, and 40c Standing-up section
41a The 1st contact terminal
41b The 2nd contact terminal
42 Rigid Plating
44 Resist
46 Support Substrate
50 INTAPOZA

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]
This invention relates to the manufacture approach of INTAPOZA used for the electrical installation between electronic parts etc.
[0002]

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PRIOR ART

[Description of the Prior Art]
Drawing 5 shows the example which constituted the fixture used for the trial of a semi-conductor wafer using INTAPOZA. In this drawing, 10 is a probe card, 12 is an interface board, and it is INTAPOZA 14 which is arranged in these middle. INTAPOZA 14 currently used with the fixture for this trial is characterized by forming the contact terminal 20 which the thin wire was made crooked to both sides of the support substrate 16, and was formed in them. By contacting elastically by pressing electrode terminal 10a prepared in the probe card 10, and electrode terminal 12a prepared in the interface board 12, the contact terminal 20 has connected the probe card 10 and the interface board 12 electrically.
[0003]
Drawing 6 is the sectional view having expanded and shown INTAPOZA 14. Two or more through holes through which it flowed electrically are established in an insulating substrate as INTAPOZA shown in drawing 6 , and INTAPOZA of isomorphism voice, the connection which is made to expose to both sides of an insulating substrate, and is electrically connected to each through hole is prepared in U.S. Pat. No. 6029344, and the configuration which connected the contact terminal of a crookedness configuration so that it might become symmetry arrangement up and down at the connection of both sides of an insulating substrate is indicated. The contact terminal of each other which set up in the crookedness configuration and was prepared in both sides of an insulating substrate is electrically connected through a through hole. All the contact terminals prepared in the top face of an insulating substrate are formed in the same configuration, and the contact terminal prepared in the inferior surface of tongue of an insulating substrate is also formed in the same configuration. In drawing 6 , the connection 19 electrically connected with the conductor layer 18 formed in the internal surface of a through tube 17 was exposed and formed in both sides of the support substrate 16, the contact terminal 20 joined to the connection 19, and the contact terminal 20 of both sides of the support substrate 16 has connected electrically in each through hole.
[0004]

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EFFECT OF THE INVENTION

[Effect of the Invention]
The manufacture yield can be raised, while according to the manufacture approach of INTAPOZA concerning this invention being able to manufacture INTAPOZA equipped with the contact terminal formed in both sides of a support substrate at the crookedness configuration and being able to reduce a manufacture man day by actuation which carries out wirebonding only to one field of a substrate, as mentioned above. Moreover, according to the manufacture approach of INTAPOZA concerning this invention, INTAPOZA can be manufactured by a series of production processes, manufacture effectiveness can be raised, and the higher efficacy of being able to reduce a manufacturing cost is done so.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]
Since INTAPOZA 14 shown in drawing 6 has elasticity when the contact terminal 20 formed in both sides of the support substrate 16 is crooked, when it is used as INTAPOZA, connections, such as an electrode terminal, are elastically contacted by pressing by the contact terminal 20, it can connect electrically, and it has the advantage that the electrical installation between electronic parts is made certainly.
However, when a contact terminal 20 was formed in both sides of the support substrate 16, since the yield in one field of the support substrate 16 and the yield in the field of another side would be multiplied, the yield as the whole product fell and the approach of giving each of one field of the support substrate 16 and the field of another side wirebonding, and forming a contact terminal 20 had the problem that a manufacturing cost became high by this. Moreover, since wirebonding was given to one field of the support substrate 16, and the field of another side, respectively, the manufacture man day started and there was a problem that a manufacturing cost became high also by this.
[0005]
In addition, as it said that INTAPOZA in which the contact terminal was formed to both sides of a support substrate was used as the approach of using it, using it for the fixture for a trial shown in drawing 5 , and also making intervene between the circuit boards, and a socket in which a semiconductor device is carried, it can use for various applications.
This invention makes it possible to manufacture more efficiently INTAPOZA in which the contact terminal was formed to both sides of the support substrate mentioned above, raises the manufacture yield and aims at offering the manufacture approach of INTAPOZA which can reduce a manufacturing cost.
[0006]

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MEANS

[Means for Solving the Problem]
This invention is equipped with the next configuration in order to attain the above-mentioned purpose.
Namely, it is formed in a crookedness configuration in one field of a support substrate, and the field of another side, and sets to the manufacture approach of INTAPOZA that the contact terminal connected mutually electrically was prepared. The process formed in the resist pattern with which covers both sides of a substrate by the insulating coat, and the part which forms said contact terminal exposes the insulating coat of one field of this substrate, the outcrop of the substrate covered with said resist pattern -- a conductor -- with the process which forms the film Wirebonding which carries out bonding of the end face of a wire to the outcrop of said resist pattern is given. The process which forms the contact terminal equipped with the pars intermedia where a end face and tip side connects the flection the flection respectively formed in a crookedness configuration, and by the side of a end face and a tip, The process which covers with an insulating coat the field in which the contact terminal of said substrate was formed, in the depth in which the flection by the side of the end face of a contact terminal is buried, It is characterized by having the process which removes the process which carries out the laminating of the resin material used as said support substrate to the depth which makes said pars intermedia of said contact terminal buried in the front face of said insulating coat, and said insulating coat and said substrate.
[0007]
Moreover, it is characterized by having the process which galvanizes on the surface of a contact terminal by using said substrate as a plating electric supply layer after the process which forms said contact terminal.
moreover, the process which forms said contact terminal -- setting -- the end face of a wire -- a conductor -- it is characterized by joining to the film, pulling up, making a wire crooked, melting the raising edge of a wire, and forming a contact terminal.
[0008]
[Embodiment of the Invention]
Hereafter, the gestalt of suitable operation of this invention is explained to a detail according to an accompanying drawing.
Drawing 1 and 2 are the explanatory views showing the manufacture approach of INTAPOZA concerning this invention. Hereafter, it explains according to a production process.
Drawing 1 shows a production process until it forms a contact terminal. Drawing 1 (a) shows the substrate 30 which supports the contact terminal formed by wirebonding. Although a large-sized substrate is used as a work piece in an actual production process in order to take and carry out much INTAPOZA, the part which serves as INTAPOZA per product is expanded and shown on explanation by a diagram.
With this operation gestalt, the copper plate was used as a substrate 30. A substrate 30 uses the ingredient of thickness suitably in consideration of workability. In the case of a copper plate, a thing with a thickness of about 0.1-0.5mm should just be used. Since a substrate 30 is etched chemically and removed at a back process, not only a copper plate but the proper ingredient

which etches simply and can be removed can be used for it.
[0009]
Drawing 1 (b) applies a photosensitive resist to both sides of a substrate 30 as an insulating coat, and shows the condition of having performed exposure and development and having formed resist pattern 32a in one field (top face) of a substrate 30. Resist pattern 32a is formed in the pattern to which the part which forms a contact terminal 20 on a substrate 30 is exposed. The whole surface of a substrate 30 is covered with resist 32b about the field of another side of a substrate 30.
[0010]
the conductor which drawing 1 (c) gives electrolysis gilding to a substrate 30, and consists outcrop 30a of one field of a substrate 30 of gilding -- the condition of having covered with the film 34 is shown. a conductor -- the film 34 is formed in order to make good bonding nature at the time of forming a contact terminal by wirebonding. Therefore, it can also form with the plating by the metal which makes good bonding nature other than electrolysis gilding, such as palladium. since etching removes a substrate 30 at a back process as mentioned above -- a conductor -- the film 34 is good to use the metal which is not removed depending on the etching reagent which etches this substrate 30. moreover, a conductor -- since it finally exposes outside as a connection of a contact terminal, the film 34 can also be considered as two or more metal lamination, as it said that gilding and palladium plating were performed to this order in consideration of weatherability
[0011]
Drawing 1 (d) shows the condition of having formed the contact terminal 40 by wirebonding which used the golden wire.
Although a contact terminal 40 is formed in the crookedness configuration where the side-face configuration formed the flection of L typeface in the both sides by the side of a end face as shown in drawing, and a tip, such a crookedness configuration can be acquired by controlling a motion of the capillary which operates a golden wire. namely, the end face of a golden wire -- a conductor -- after joining to the film 34, a capillary is pulled up upward, and subsequently to the order of sideways-facing-up-sideways-facing up, it can be made to be able to move and can form by melting the raising edge of the golden wire pulled up.
[0012]
by performing the above crookedness actuation shows to drawing 1 (d) -- as -- a contact terminal 40 -- a conductor -- it will have standing-up section 40a by the side of the end face linked to the film 34, standing-up section 40b of pars intermedia, and standing-up section 40c by the side of a tip. By this, the amount of [of a contact terminal 40] end face flank becomes the flection crooked to L typeface between standing-up section 40b of pars intermedia, and it becomes the flection to which the tip side of a contact terminal 40 is crooked to L typeface between standing-up section 40b of pars intermedia.
For whole quantity, the die length of standing-up section 40a by the side of about 2.5mm and a end face is [the die length of standing-up section 40c by the side of about 1mm and a tip of the contact terminal 40 of an operation gestalt] about 1mm.
Although the golden wire of diameter extent of 30 micrometer is used with this operation gestalt, in order to acquire a fixed width method and fixed elasticity, wirebonding of the wire rod of a ribbon form (thin plate-like) may be carried out, and a contact terminal 40 may be formed.
[0013]
Drawing 1 (e) shows the condition of having performed rigid plating 42 to the front face of a contact terminal 40, with the electrolysis plating which uses a substrate 30 as a plating electric supply layer in order to give fixed elasticity to a contact terminal 40. In itself, even if a golden wire is supple, it does not have sufficient elasticity. For this reason, rigid plating is performed and necessary rigidity and elasticity are acquired as a contact terminal 40. Nickel-cobalt alloy plating etc. can be used as rigid plating. With this operation gestalt, after performing these rigid plating 42, it plated with gold on the front face of the rigid plating 42 as protection plating which gives weatherability.
In addition, after performing rigid plating, the elasticity of a contact terminal 40 can be further

raised by heat-treating at necessary temperature.
[0014]
Drawing 2 shows a production process until it forms INTAPOZA, after forming a contact terminal 40.
Drawing 2 (a) shows the condition of having covered the field in which the contact terminal 40 of a substrate 30 was formed with the resist 44 which is an insulating coat. As a resist 44 crosses the field in which the contact terminal 40 of a substrate 30 was formed to the whole surface and becomes the thickness which a tip side exposes, i.e., the thickness in which the flection by the side of the end face of a contact terminal 40 (part of standing-up section 40a and standing-up section 40b to connect) is buried, from standing-up section 40b of the pars intermedia of a contact terminal 40, it is mostly covered to homogeneity. By applying liquid-like resist material to the front face of a substrate 30, a resist 44 can cover the whole surface of a substrate 30 by the thickness of homogeneity mostly.
[0015]
Drawing 2 (b) is the process which forms the support substrate 46 of INTAPOZA, and shows the condition of having applied the resin material used as the support substrate 46 to the front face of a resist 44. Here, resin material is applied so that it may become the thickness of homogeneity covering the thickness in which standing-up section 40b of the pars intermedia of a contact terminal 40 is buried all over a substrate 30. The coating thickness of resin material is about 500 micrometers. The proper resin which has electric insulation, for example, the heat-curing mold resin of an epoxy system etc., can be used for resin material. When using heat-curing mold resin, it heats and resin material is stiffened, after applying resin material. By stiffening resin material in the condition that the contact terminal 40 is supported by the substrate 30, deformation of the support substrate 46 can be suppressed and resin material can be stiffened. Thus, in case a substrate 30 stiffens the resin material of a hardening mold and forms the support substrate 46, it also has the shape-retaining operation which suppresses deformation.
[0016]
Drawing 2 (c) shows the condition of having etched the resist 44 and the substrate 30 chemically and having removed them in order to leave only the support substrate 46.
Since etching of the substrates 30, such as a resist 44 and a copper plate, cannot be performed depending on the same etching reagent, the actuation which etches a resist 44 and a substrate 30 A resist 44 is etched previously (Resists 32a and 32b are removed in that case). Then, the approach of etching and removing a substrate 30 may be used, and after etching and removing a substrate 30 (resist 32b is removed in that case), the approach of etching and removing a resist 44 may be used.
In this way, as shown in drawing 2 (c), INTAPOZA 50 equipped with the contact terminal formed in both sides of the support substrate 46 which consists of resin at the crookedness configuration which has elasticity is obtained.
[0017]
Drawing 3 shows the condition of having seen INTAPOZA 50 formed in the piece of an individual from the top face. Predetermined spacing is opened in the direction in every direction at the support substrate 46 formed in the rectangle, and it is arranged in line by the contact terminal 40.
As INTAPOZA 50 of this operation gestalt was shown in drawing 2 (c), 1st contact terminal 41a and 2nd contact terminal 41b were formed in the fields of one side of the support substrate 46, and another side. That is, the part by the side of the tip of the contact terminal 40 formed previously in one acts as the 1st contact terminal 41a crooked to L typeface by the top-face side of the support substrate 46, and the part by the side of the end face of a contact terminal 40 acts as the 2nd contact terminal 41b crooked to L typeface by the inferior-surface-of-tongue side of the support substrate 46. the edge of 2nd contact terminal 41b -- a conductor -- the film 34 has covered.
[0018]
Drawing 4 shows the example in which the fixture used for the trial of a semi-conductor wafer

using INTAPOZA of the operation gestalt mentioned above was formed. INTAPOZA 50 intervened between the probe card 10 and the interface board 12, and has connected the probe card 10 and the interface board 12 electrically. 1st contact terminal 41a formed in one field of the support substrate 46 of INTAPOZA 50 contacts by pressing elastically in electrode terminal 12a of an interface board 12, and 2nd contact terminal 41b formed in the field of another side of the support substrate 46 contacts by pressing elastically in electrode terminal 10a of a probe card 10, and flows electrically in it.

[0019]

As mentioned above, by the manufacture approach of this operation gestalt By a series of production processes of forming a contact terminal 40 in a predetermined crookedness configuration to one field of a substrate 30, and forming the support substrate 46 of a gestalt with which resin material was applied to the substrate 30, and the laminating of the insulating material was carried out to the substrate 30 Since INTAPOZA can be formed, it becomes a production process suitable for mass production, and there is an advantage that INTAPOZA can be manufactured efficiently. Moreover, since wirebonding is given and formed only about one field of a substrate 30 in case a contact terminal 40 is formed, compared with the approach of carrying out wirebonding to both sides of a substrate, respectively, and forming a contact terminal in them, the fall of the manufacture yield by bonding mistake can be suppressed effectively, and there is an advantage that a manufacturing cost can be lowered by this. Moreover, it is also possible to suppress the fall of the yield further by advancing to the process in which the configuration of a contact terminal 40 etc. is examined where a contact terminal 40 is formed, and only an excellent article forms the support substrate 46 by wirebonding.

[0020]

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the manufacture approach of INTAPOZA concerning this invention.
[Drawing 2] It is the explanatory view showing the manufacture approach of INTAPOZA concerning this invention.
[Drawing 3] It is the top view of INTAPOZA formed in the piece of an individual.
[Drawing 4] It is the explanatory view showing the example which constituted the fixture for a trial using INTAPOZA.
[Drawing 5] It is the explanatory view showing the conventional configuration of INTAPOZA used for the fixture for a trial.
[Drawing 6] It is the sectional view showing the configuration of conventional INTAPOZA.
[Description of Notations]
10 Probe Card
12 Interface Board
14 INTAPOZA
20 Contact Terminal
30 Substrate
30a Outcrop
32a Resist pattern
32b Resist
34 Conductor -- Film
40 Contact Terminal
40a, 40b, and 40c Standing-up section
41a The 1st contact terminal
41b The 2nd contact terminal
42 Rigid Plating
44 Resist
46 Support Substrate
50 INTAPOZA

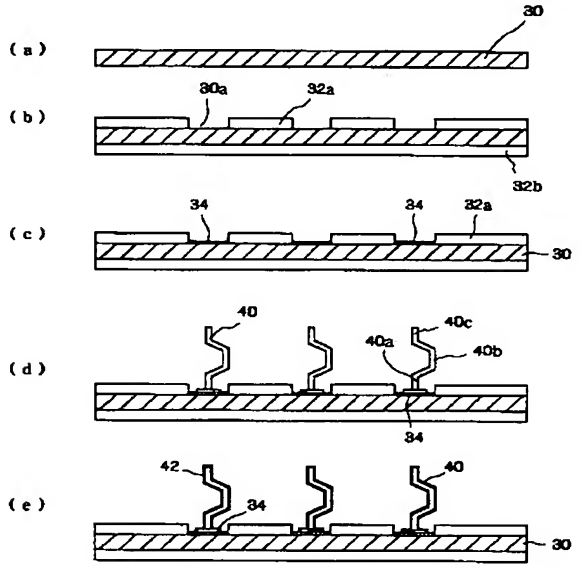
[Translation done.]

* NOTICES *

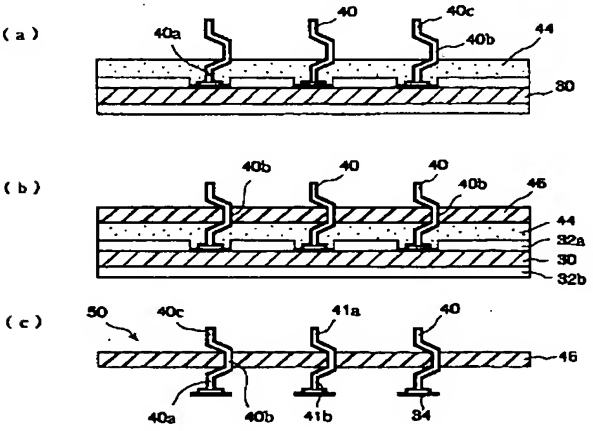
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

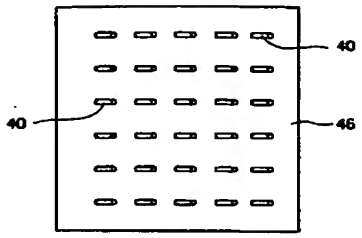
[Drawing 1]



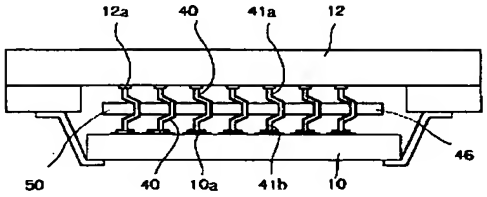
[Drawing 2]



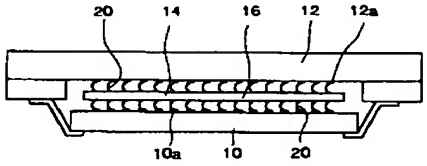
[Drawing 3]



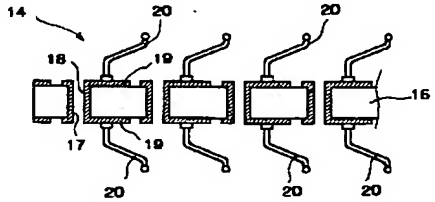
[Drawing 4]



[Drawing 5]



[Drawing 6]



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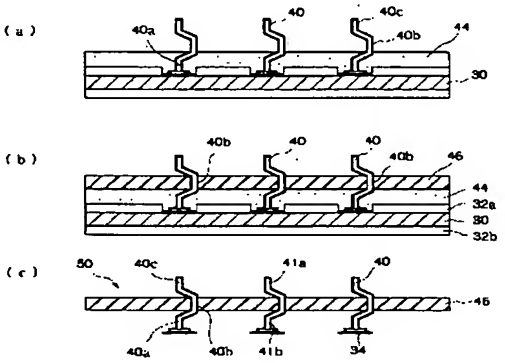
(54)【発明の名称】インターポーザの製造方法

(57)【要約】
【課題】支持基板の両面に屈曲形状に形成された接触端子を備えるインターポーザの製造歩留まりを向上させ、製造コストを引き下げる。
【解決手段】基板３０の両面を絶縁皮膜により被覆し、該基板の一方の面の絶縁被膜を前記接触端子を形成する部位が露出するレジストパターン３２ａに形成する工程と、前記レジストパターンの露出部にワイヤの基端をボンディングするワイヤボンディングを施し、基端側と先端側とが各々屈曲形状に形成される屈曲部と基端側と先端側の屈曲部を連結する中間部とを備えた接触端子４０を形成する工程と、前記基板の接触端子を形成した面を、接触端子の基端側の屈曲部４０ａが埋没する深さに絶縁皮膜４４により被覆する工程と、前記絶縁皮膜の表面に、前記接触端子の前記中間部４０ｂを埋没させる深さに支持基板４６となる樹脂材を積層する工程と、前記絶縁皮膜４４と前記基板３０とを除去する工程とを備える。
【選択図】　図２



【特許請求の範囲】
【請求項１】
支持基板の一方の面と他方の面に、屈曲形状に形成され、相互に電気的に接続された接触端子が設けられたインターポーザの製造方法において、
基板の両面を絶縁皮膜により被覆し、該基板の一方の面の絶縁被膜を前記接触端子を形成する部位が露出するレジストパターンに形成する工程と、
前記レジストパターンにより被覆された基板の露出部に導体膜を形成する工程と、
前記レジストパターンの露出部にワイヤの基端をボンディングするワイヤボンディングを施し、基端側と先端側とが各々屈曲形状に形成される屈曲部と基端側と先端側の屈曲部を連結する中間部とを備えた接触端子を形成する工程と、
前記基板の接触端子を形成した面を、接触端子の基端側の屈曲部が埋没する深さに絶縁皮膜により被覆する工程と、
前記絶縁皮膜の表面に、前記接触端子の前記中間部を埋没させる深さに前記支持基板となる樹脂材を積層する工程と、
前記絶縁皮膜と前記基板とを除去する工程とを備えることを特徴とするインターポーザの製造方法。
【請求項２】
前記接触端子を形成する工程の後、前記基板をめっき給電層として、接触端子の表面にめっきを施す工程を備えることを特徴とする請求項１記載のインターポーザの製造方法。
【請求項３】
前記接触端子を形成する工程において、ワイヤの基端を導体膜に接合し、ワイヤを屈曲させながら引き上げ、ワイヤの引き上げ端を溶断して接触端子を形成することを特徴とする請求項１または２記載のインターポーザの製造方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は電子部品間の電気的接続等に使用されるインターポーザの製造方法に関する。
【０００２】
【従来の技術】
図５は、インターポーザを利用して半導体ウエハの試験に使用する治具を構成した例を示す。同図で、１０がプローブカード、１２がインターフェースボードであり、これらの中間に配置されているものがインターポーザ１４である。この試験用の治具で使用されているインターポーザ１４は、支持基板１６の両面に、細いワイヤを屈曲させて形成した接触端子２０を設けたことを特徴とする。接触端子２０はプローブカード１０に設けられている電極端子１０ａとインターフェースボード１２に設けられている電極端子１２ａとを弾性的に押接することによって、プローブカード１０とインターフェースボード１２とを電気的に接続している。
【０００３】
図６は、インターポーザ１４を拡大して示した断面図である。米国特許第６０２９３４４号には、図６に示すインターポーザと同形態のインターポーザとして、絶縁基板に複数の電気的に導通したスルーホールを設け、絶縁基板の両面に露出させて各々のスルーホールに電気的に接続する接続部を設け、絶縁基板の両面の接続部に上下に対称配置となるよう屈曲形状の接触端子を接続した構成が記載されている。絶縁基板の両面に屈曲形状に立設して設けられた接触端子は、スルーホールを介して互いに電気的に接続する。絶縁基板の上面に設けられた接触端子はすべて同一形状に形成され、絶縁基板の下面に設けられた接触端子も同一形状に形成されている。図６では、支持基板１６の両面に、貫通孔１７の内壁面に形成された導体層１８と電気的に接続する接続部１９が露出して設けられ、接続部１９に接触端子２０が接合し、各々のスルーホールで支持基板１６の両面の接触端子２０が電気的に接続している。
【０００４】

【発明が解決しようとする課題】
図６に示すインターポーザ１４は、支持基板１６の両面に形成された接触端子２０が屈曲していることにより弾性を有するから、インターポーザとして使用した際に接触端子２０によって電極端子等の接続部を弾性的に押接して電気的に接続することができ、電子部品間の電気的接続が確実になされるという利点がある。
しかしながら、支持基板１６の両面に接触端子２０を形成する場合に、支持基板１６の一方の面と他方の面のそれぞれにワイヤボンディングを施して接触端子２０を形成する方法は、支持基板１６の一方の面における歩留まりと他方の面における歩留まりが相乗されることになるから、製品全体としての歩留まりが低下し、これによって製造コストが高くなるという問題があった。また、支持基板１６の一方の面と他方の面とにそれぞれワイヤボンディングを施すことから、製造工数がかかり、これによっても製造コストが高くなるという問題があった。
【０００５】
なお、支持基板の両面に接触端子を形成したインターポーザは、図５に示す試験用の治具に使用する他に、回路基板間に介在させて使用する方法や、半導体装置を搭載するソケットとして使用するといったように、種々の用途に利用できるものである。
本発明は、上述した支持基板の両面に接触端子を形成したインターポーザをより効率的に製造することを可能とし、製造歩留まりを向上させ、製造コストを引き下げることができるインターポーザの製造方法を提供することを目的とするものである。
【０００６】
【課題を解決するための手段】
本発明は、上記目的を達成するため次の構成を備える。
すなわち、支持基板の一方の面と他方の面に、屈曲形状に形成され、相互に電気的に接続された接触端子が設けられたインターポーザの製造方法において、基板の両面を絶縁皮膜により被覆し、該基板の一方の面の絶縁被膜を前記接触端子を形成する部位が露出するレジストパターンに形成する工程と、前記レジストパターンにより被覆された基板の露出部に導体膜を形成する工程と、前記レジストパターンの露出部にワイヤの基端をボンディングするワイヤボンディングを施し、基端側と先端側とが各々屈曲形状に形成される屈曲部と基端側と先端側の屈曲部を連結する中間部とを備えた接触端子を形成する工程と、前記基板の接触端子を形成した面を、接触端子の基端側の屈曲部が埋没する深さに絶縁皮膜により被覆する工程と、前記絶縁皮膜の表面に、前記接触端子の前記中間部を埋没させる深さに前記支持基板となる樹脂材を積層する工程と、前記絶縁皮膜と前記基板とを除去する工程とを備えることを特徴とする。
【０００７】
また、前記接触端子を形成する工程の後、前記基板をめっき給電層として、接触端子の表面にめっきを施す工程を備えることを特徴とする。
また、前記接触端子を形成する工程において、ワイヤの基端を導体膜に接合し、ワイヤを屈曲させながら引き上げ、ワイヤの引き上げ端を溶断して接触端子を形成することを特徴とする。
【０００８】
【発明の実施の形態】
以下、本発明の好適な実施の形態について添付図面にしたがって詳細に説明する。
図１、２は、本発明に係るインターポーザの製造方法を示す説明図である。以下、製造工程にしたがって説明する。
図１は、接触端子を形成するまでの製造工程を示す。図１（ａ）は、ワイヤボンディングによって形成する接触端子を支持する基板３０を示す。実際の製造工程ではインターポーザを多数個取りするため、大判の基板をワークとして使用するが、図では説明上、製品単位でインターポーザとなる部位を拡大して示している。
本実施形態では基板３０として銅板を使用した。基板３０は作業性を考慮して適宜厚さの材料を使用する。銅板の場合は０．１～０．５ｍｍ程度の厚さのものを使用すればよい。

基板３０は、後工程で化学的にエッチングして除去するから、銅板に限らず、簡単にエッチングして除去できる適宜材料を使用することができる。

【０００９】

図１（ｂ）は、基板３０の両面に絶縁被膜として感光性レジストを塗布し、露光および現像を行って基板３０の一方の面（上面）にレジストパターン３２ａを形成した状態を示す。レジストパターン３２ａは、基板３０上で接触端子２０を形成する部位を露出させるパターンに形成する。基板３０の他方の面については、レジスト３２ｂによって基板３０の全面を被覆する。

【００１０】

図１（ｃ）は、基板３０に電解金めっきを施して、基板３０の一方の面の露出部３０ａを金めっきからなる導体膜３４によって被覆した状態を示す。導体膜３４は、ワイヤボンディングによって接触端子を形成する際のボンディング性を良好にするために設けるものである。したがって、電解金めっきの他にパラジウム等のボンディング性を良好にする金属によるめっきにより形成することもできる。前述したように、基板３０は後工程でエッチングによって除去するから、導体膜３４はこの基板３０をエッチングするエッチング液によっては除去されない金属を使用するのがよい。また、導体膜３４は最終的に接触端子の接続部として外部に露出するから、耐候性を考慮して金めっき、パラジウムめっきをこの順に施すといったように複数の金属層構成とすることも可能である。

【００１１】

図１（ｄ）は、金ワイヤを用いたワイヤボンディングによって接触端子４０を形成した状態を示す。

接触端子４０は図のような基端側と先端側の双方に側面形状がＬ字形の屈曲部を形成した屈曲形状に形成するものであるが、このような屈曲形状は、金ワイヤを操作するキャピラリの動きを制御することによって得ることができる。すなわち、金ワイヤの基端を導体膜３４に接合した後、キャピラリを上向きに引き上げ、次いで、横向き－上向き－横向き－上向きの順に移動させ、引き上げた金ワイヤの引き上げ端を溶断することによって形成することができる。

【００１２】

上記のような屈曲動作を行うことにより、図１（ｄ）に示すように、接触端子４０は、導体膜３４に接続する基端側の起立部４０ａと、中間部の起立部４０ｂと先端側の起立部４０ｃを有することとなる。これによって、接触端子４０の基端側部分が、中間部の起立部４０ｂとの間でＬ字形に屈曲する屈曲部となり、接触端子４０の先端側が、中間部の起立部４０ｂとの間でＬ字形に屈曲する屈曲部となる。

実施形態の接触端子４０は全体高が約２．５ｍｍ、基端側の起立部４０ａの長さが約１ｍｍ、先端側の起立部４０ｃの長さが約１ｍｍである。

本実施形態では３０μｍ径程度の金ワイヤを使用しているが、一定の幅寸法と一定の弾性を得るために、リボン形（薄平板状）の線材をワイヤボンディングして接触端子４０を形成してもよい。

【００１３】

図１（ｅ）は、接触端子４０に一定の弾性を付与するため、基板３０をめっき給電層とする電解めっきにより、接触端子４０の表面に剛性めっき４２を施した状態を示す。金ワイヤはそれ自体では柔軟性があっても十分な弾性を有しない。このため、剛性めっきを施して接触端子４０として所要の剛性と弾性が得られるようにする。剛性めっきとしては、ニッケルーコバルト合金めっき等が利用できる。本実施形態では、これらの剛性めっき４２を施した後、耐候性を付与する保護めっきとして金めっきを剛性めっき４２の表面に施した。

なお、剛性めっきを施した後、所要の温度で加熱処理を施すことによって接触端子４０の弾性をさらに高めることができる。

【００１４】

図２は、接触端子４０を形成した後、インターポーザを形成するまでの製造工程を示す。

図２（ａ）は、基板３０の接触端子４０を形成した面を絶縁皮膜であるレジスト４４によって被覆した状態を示す。レジスト４４は、基板３０の接触端子４０を形成した面を全面にわたり、接触端子４０の中間部の起立部４０ｂから先端側が露出する厚さ、すなわち、接触端子４０の基端側の屈曲部（起立部４０ａと起立部４０ｂとの連結する部分）が埋没する厚さとなるようにしてほぼ均一に被覆する。液体状のレジスト材を基板３０の表面に塗布することにより、基板３０の全面をほぼ均一の厚さでレジスト４４によって被覆することができる。

【００１５】

図２（ｂ）は、インターポーザの支持基板４６を形成する工程で、レジスト４４の表面に支持基板４６となる樹脂材を塗布した状態を示す。ここで、樹脂材は接触端子４０の中間部の起立部４０ｂが埋没する厚さに、基板３０の全面にわたって均一の厚さとなるように塗布する。樹脂材の塗布厚は５００μｍ程度である。樹脂材には、電気的絶縁性を有する適宜樹脂、たとえばエポキシ系の熱硬化型樹脂等が使用できる。熱硬化型樹脂を使用する場合は、樹脂材を塗布した後、加熱して樹脂材を硬化させる。基板３０に接触端子４０が支持されている状態で樹脂材を硬化させることにより、支持基板４６の変形を抑えて樹脂材を硬化させることができる。このように、基板３０は硬化型の樹脂材を硬化させて支持基板４６を形成する際に変形を抑える保形の作用も有している。

【００１６】

図２（ｃ）は、支持基板４６のみを残すため、レジスト４４と基板３０とを化学的にエッチングして除去した状態を示す。

レジスト４４と銅板等の基板３０のエッチングは同じエッチング液によっては行えないから、レジスト４４と基板３０とをエッチングする操作は、レジスト４４を先にエッチングし（その際にレジスト３２ａ、３２ｂが除去される）、その後、基板３０をエッチングして除去する方法でもよいし、基板３０をエッチングして除去した後（その際にレジスト３２ｂが除去される）、レジスト４４をエッチングして除去する方法でもよい。

こうして、図２（ｃ）に示すように、樹脂からなる支持基板４６の両面に、弾性を有する屈曲形状に形成された接触端子を備えるインターポーザ５０が得られる。

【００１７】

図３は、個片に形成したインターポーザ５０を上面から見た状態を示す。矩形に形成された支持基板４６に縦横方向に所定間隔をあけて接触端子４０が整列して配置されている。本実施形態のインターポーザ５０は、図２（ｃ）に示すように、支持基板４６の一方と他方の各々の面に第１の接触端子４１ａと第２の接触端子４１ｂとが形成されたものとなる。すなわち、先に一体的に形成した接触端子４０の先端側の部分が支持基板４６の上面側でＬ字形に屈曲した第１の接触端子４１ａとして作用し、接触端子４０の基端側の部分が支持基板４６の下面側でＬ字形に屈曲した第２の接触端子４１ｂとして作用する。第２の接触端子４１ｂの端部には導体膜３４が被着している。

【００１８】

図４は、上述した実施形態のインターポーザを用いて半導体ウエハの試験に使用する治具を形成した例を示す。インターポーザ５０がプローブカード１０とインターフェースボード１２との間に介在し、プローブカード１０とインターフェースボード１２とを電気的に接続している。インターポーザ５０の支持基板４６の一方の面に形成された第１の接触端子４１ａがインターフェースボード１２の電極端子１２ａに弾性的に押接し、支持基板４６の他方の面に形成された第２の接触端子４１ｂがプローブカード１０の電極端子１０ａに弾性的に押接して、電気的に導通する。

【００１９】

上述したように、本実施形態の製造方法では、基板３０の一方の面に対して所定の屈曲形状に接触端子４０を形成し、基板３０に樹脂材を塗布して基板３０に絶縁材が積層された形態の支持基板４６を形成するという一連の製造工程によって、インターポーザを形成することができることから、量産に適した製造工程となり、インターポーザを効率的に製造することができるという利点がある。また、接触端子４０を形成する際に、基板３０の一

方の面についてのみワイヤボンディングを施して形成するから、基板の両面にそれぞれワイヤボンディングして接触端子を形成する方法にくらべて、ボンディングミスによる製造歩留まりの低下を効果的に抑えることができ、これによって製造コストを下げることができるという利点がある。
また、ワイヤボンディングによって接触端子４０を形成した状態で接触端子４０の形状等を試験し、良品のみ支持基板４６を形成する工程に進めることでさらに歩留まりの低下を抑えることも可能である。

【００２０】

【発明の効果】

本発明に係るインターポーザの製造方法によれば、上述したように、基板の一方の面にのみワイヤボンディングする操作によって支持基板の両面に屈曲形状に形成された接触端子を備えるインターポーザを製造することができ、製造工数を減らすことができるとともに、製造歩留まりを向上させることができる。また、本発明に係るインターポーザの製造方法によれば、一連の製造工程によってインターポーザを製造することができ、製造効率を向上させることができて、製造コストを引き下げることができる等の著効を奏する。

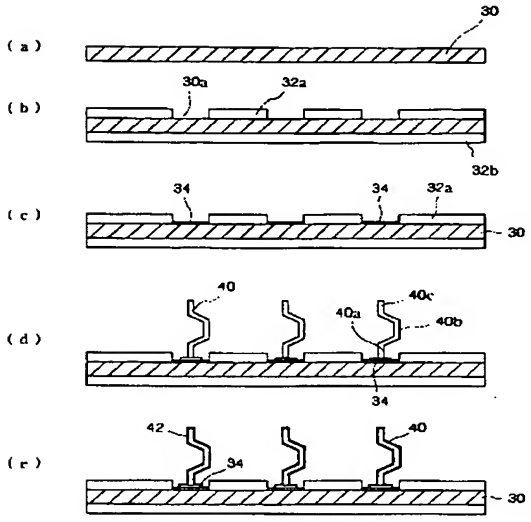
【図面の簡単な説明】

【図１】本発明に係るインターポーザの製造方法を示す説明図である。
【図２】本発明に係るインターポーザの製造方法を示す説明図である。
【図３】個片に形成したインターポーザの平面図である。
【図４】インターポーザを用いて試験用の治具を構成した例を示す説明図である。
【図５】試験用の治具に用いられているインターポーザの従来の構成を示す説明図である。
【図６】従来のインターポーザの構成を示す断面図である。

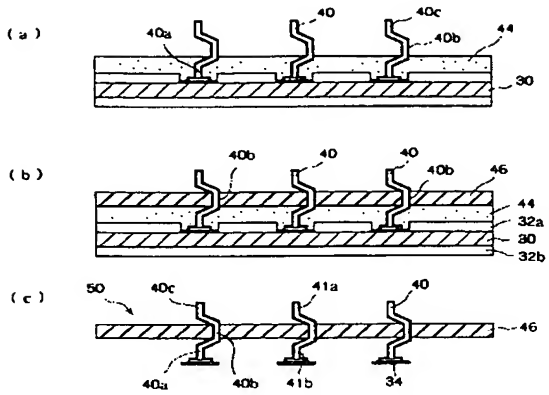
【符号の説明】

１０　プローブカード
１２　インターフェースボード
１４　インターポーザ
２０　接触端子
３０　基板
３０ａ　露出部
３２ａ　レジストパターン
３２ｂ　レジスト
３４　導体膜
４０　接触端子
４０ａ、４０ｂ、４０ｃ　起立部
４１ａ　第１の接触端子
４１ｂ　第２の接触端子
４２　剛性めっき
４４　レジスト
４６　支持基板
５０　インターポーザ

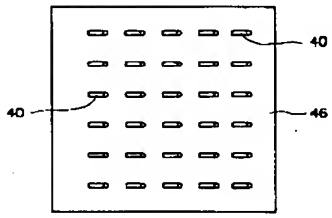
【図１】



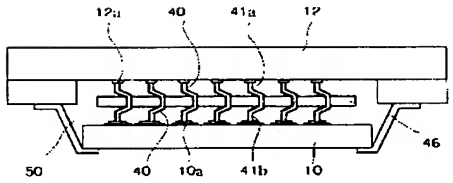
【図２】



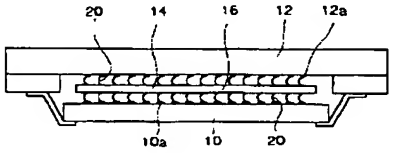
【図３】



【図４】



【図５】



【図６】